

characteristics. For example, in a dynamic vehicle testing method used by the assignee of the present invention, a vehicle is driven so that the relevant tire forces and footprints are measured. Instrumentation associated with the vehicle and test surface is used to measure the desired tire properties and a contact patch photograph can be taken.² This process is repeated many times during a dynamic vehicle test to collect enough data to statistically reach a desired confidence level in the evaluation.

It is important that conditions remain set during the multiple test runs so that there is no unknown inconsistency skewing the data from different runs. Specifically, during such multiple test runs, the temperature of the tire often increases, thereby increasing the pressure within the tire. The present invention eliminates any pressure rise/drop and thus minimizes any data inconsistencies which would have resulted from tire pressure changes.

Accordingly, applicant's invention is specifically directed towards such a dynamic tire-testing situation. The claimed method includes the steps of taking tire-related measurements on a tire/wheel assembly during multiple test runs, and compiling data from the multiple test runs to evaluate tire performance. The method also includes the step of maintaining the pressure within the test tire at a desired test pressure throughout the multiple test runs with a pressure-controlling device mounted on the tire/wheel assembly. The claimed pressure-controlling device provides pressure adjustments that are very refined to accommodate the tire-testing situation. Specifically, the pressure-controlling device 20 is designed to adjust for pressure increases of less than 1/4 psi (0.250 psi), less than 1/8 psi (0.125 psi), less than 1/16 psi (0.062 psi), less than about 1/32 psi (0.031 psi), or about 1/36 psi (0.028 psi).

Turning now to the particular claim rejections, claims 1-11 and 22 have been rejected as being obvious over U.S. Patent No. 6,278,363 to Bezek in view of U.S. Patent No. 4,582,108 to Markow. Bezek is directed towards notifying a driver of an

2. Alternatively, the tire-wheel system can be rolled against a test drum over multiple test runs via the use of an external loading frame, whereby no vehicle is required.

under-inflated condition in a "run-flat" tire so that he/she can seek appropriate maintenance and repair.³ To this end, the Bezek system/method comprises a pressure sensor 12 that provides pressure data associated with a particular tire at an unknown relative position on the vehicle⁴ and a physical parameter sensor 14 (i.e., an inertial sensor, an accelerometer, a lateral force detector, an accelerometer sensitive to lateral force, etc.) that provides information about the motion of a particular wheel on the vehicle. This data/information is then evaluated to provide the vehicle's operator with an indication that an air pressure of the particular tire at the relative mounting position is less than a proper air pressure so that peak vehicle performance and necessary maintenance may be obtained.

The Examiner appears to contend that the Bezek physical parameter sensor 14 performs the steps of "taking tire-related measurements" and "compiling data from multiple test runs." Even if this was true, the Bezek system does not compile the "data from multiple test runs" to "evaluate tire performance." This data is instead only used to notify the vehicle's operator of an underinflated condition in a particular tire. Whatever Markow's teaching may be regarding motion sensors, it does not cure this shortcoming in the base Bezek reference.

Moreover, Bezek does not seem to teach the claimed step of "maintaining the pressure within the test tire at a desired test pressure throughout the multiple test runs with a pressure-controlling device mounted on the tire/wheel assembly." Instead, the primary purpose of the Bezek invention appears to be to simply notify the vehicle's driver of an under-inflated condition and to inform the driver of the location of the tire

3. A vehicle operator may be unaware that a run-flat tire has lost its air pressure from visual inspection because of the construction of the run-flat tire. The run-flat tire generally handles adequately and is greatly superior in handling characteristics in comparison to a conventional flat tire that has lost air pressure. However, a vehicle operator may be unaware in the deterioration of the handling characteristics of a vehicle due to the loss of air pressure in the run-flat tire.

4. The unknown relative position represents one possible mounting position out of a group of possible mounting positions on the vehicle.

suffering from this condition. For this same reason, the applied art does not show or suggest the step of releasing gas from the tire if the tire pressure exceeds the desired test pressure by 1/36 psi (claims 2 and 3); the step of adjusting the tire pressure if the measured tire pressure is above or below the desired test pressure by at least 1/4 psi (claims 4, 7-9 and 22), at least 1/16 psi (claim 5), or at least 1/36 psi (claim 6); and/or the step of driving the vehicle so that the relevant tire rolls over a plate having instrumentation associated with the plate to measure tire properties (claim 11).

Claims 12-21, 23, and 24 have been rejected as being obvious over U.S. Patent No. 5,505,080 to McGhee in view of U.S. Patent No. 5,472,032 to Winston. McGhee is directed towards balancing pressure among respective tires in, for example, an industrial truck, wherein such balancing is important for mileage and longevity purposes. This reference does not even remotely relate to a tire-testing situation, and thus is not concerned with very refined adjustments. Specifically, McGhee does not show or suggest a pressure-controlling device that is designed to adjust for pressure increases of less than 1/4 psi (claims 12, 17-21, 23 and 24), less than 1/8 psi (claim 13), less than 1/16 psi (claim 14), less than about 1/32 psi (claim 15), or about 1/36 psi (claim 16). Whatever Winston's teaching may be regarding gas sources, the reference does not overcome this deficiency in the McGee patent.

Accordingly, it is respectfully submitted that claims 1-24 are patentable over the applied art.

Regarding claims 23 and 24, they set forth the combination of a vehicle and the pressure-controlling device of claim 12 and further specify that the pressure-controlling device is mounted the tire/wheel assembly of the vehicle. It is respectfully submitted that these claims are definite, conclusive, and distinctly claim the subject matter regarded as the invention.

Conclusion

In view of the foregoing, the present application is believed to be in a condition for allowance and an early indication to that effect is earnestly solicited.

Should a petition for an Extension of Time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary) petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988, Order No. FIREP9910112US.

Respectfully submitted,

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CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

Date: April 15, 2002

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